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Polychaetous Annelids from Matsushima Bay[1)]

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(*With 10 Text-figures*)

The following account of the polychaetous annelids from Matsushima Bay and its vicinity, Miyagi Prefecture, is based upon a collection made by the staff of the Zoological Institute of the Tohoku University under the direction of the late Professor Sanji Hozawa in 1941, 1942 and 1943. The collection includes 45 species in 14 families, of which 28 species are Errantia and the other 17 are Sedentaria.

Concerning the fauna of polychaetous annelids from northern Japan there are some references of former authors ; Grube (1877), Moore (1903), Izuka (1912), Frickhinger (1916), Nilsson (1928) and Okuda (1934, 1936, 1937, 1938 and 1939). Moore (1903) recorded following 5 species from Sendai Bay : *Pectinaria hyperborea, Amphitrite japonica, A. bifurcata* (*A. ramosissima*), *Polymnia nesidensis* var. *japonica* and *Terebellides stroemi*. Izuka (1912) described 9 species from northern Honshu, one of which, *Nereis japonica*, deriving from Matsushima Bay. The senior author (1937, 1939) studied the specimens of Onagawa Bay and enumerated 62 species, of which 16 are also included in the present collection.

The present collection is composed partly of boreo-arctic forms and partly of tropical or subtropical forms, the former slightly surpassing the latter. Of 70 species described by Fauvel in his work on the polychaetous fauna from Seto and its vicinity, about one-third of them could be found in the present collection, and of 74 species described by the senior author from Shimoda, Izu Peninsula, 19 species could be also found in the present collection. It may be noteworthy that there were no representatives of the family Amphinomidae and the genus *Eunice*, which are commonly found in warm waters.

The specimens of this collection were first submitted to the senior author, but he died in December of 1950 leaving the Japanese manuscript and some notes and sketches. Recently these manuscript, notes and sketches were handed over to the junior author and he has reexamined the specimens and prepared here the report. The text-figures in the present report were all reproduced from original

1) Contributions from the Akkeshi Marine Biological Station, No. 66.

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drawings of the senior author.

Before proceeding further we wish to express our hearty thanks to the late Professor Sanji Hozawa who placed the valuable collection at our disposal and also to Professor Tohru Uchida for his kind guidance in the course of the investigation.

The following is a list of the species found in the present collection.

Family Aphroditidae
1) *Lepidonotus sagamiana* (Izuka)
2) *Lepidonotus squamatus* (Linnaeus)
3) *Lepidonotus helotypus* (Grube)
4) *Lepidonotus dentatus* n. sp.
5) *Harmothoë (Evarne) forcipata* Marenzeller
6) *Harmothoë imbricata* (Linnaeus)
7) *Halosydna nebulosa* Grube

Family Phyllodocidae
8) *Phyllodoce castanea* (Marenzeller)
9) *Phyllodoce maculata* (Linnaeus)
10) *Eularia (Eumida) sanguinea* (Oersted)

Family Syllidae
11) *Syllis (Typosyllis) variegata* Grube
12) *Syllis* sp.

Family Nereidae
13) *Nereis japonica* Izuka
14) *Nereis virens* Sars
15) *Nereis ezoensis* Izuka
16) *Nereis pelagica* Linnaeus
17) *Perinereis nuntia* (Savigny) var. *brevicirris* Grube
18) *Perinereis cultrifera* (Grube)
19) *Platynereis agassizi* Ehlers

Family Nephthydidae
20) *Nephthys caeca* (Fabricius)

Family Glyceridae
21) *Glycera subaenea* Grube
22) *Glycera rauxii* Audouin et M. Edwards

Family Eunicidae
23) *Marphysa sanguinea* (Montagu)
24) *Diopatra neapolitana* Delle Chiaje
25) *Lumbriconereis impatiens* Claparéde
26) *Lumbriconereis latreilli* Audouin et M. Edwards
27) *Arabella iricolor* (Montagu)
28) *Staurocephalus matsushimaensis* n. sp.

Family Cirratulidae
29) *Cirratulus chrysoderma* Claparéde
30) *Audouinia comosa* (Marenzeller)
31) *Acrocirrus validus* Marenzeller

Family Capitellidae
32) *Notomastus latericeus* Sars

Family Arenicolidae
33) *Arenicola cristata* Stimpson
34) *Arenicola claparedii* Levinsen

Family Amphictenidae
35. *Pectinaria hyperborea* Malmgren

Family Terebellidae
36) *Amphitrite oculata* Hessle
37) *Amphitrite rubra* (Risso)
38) *Nicolea gracilibranchis* (Grube)
39) *Pista elongata* Moore
40) *Thelepus setosus* (Quatrefages)
41) *Amaea trilobata* (Sars)

Family Sabellidae
42) *Sabellastarte indica* (Savigny)
43) *Potamilla reniformis* (O. F. Müller)
44) *Hydroides norvegica* Gunnerus
45) *Spirorbis foraminosus* Moore *et Bush*

Description of the species

Family APHRODITIDAE

Lepidonotus sagamiana (Izuka)

Lepidonotus sagamiana : Fauvel, 1936, p. 49.
Polynoë sagamiana : Izuka, 1912, p. 17, pl. 4, figs. 11–15.
Polynoë clava : Izuka (non Montagu), 1912, p. 15, pl. 3, figs. 10–11.

Occurrence : Mahanashi-jima (Sp. No. 172).

There are two specimens, the larger one measuring 22 mm by 4 mm at the widest part without the feet for 24 chaetigers. The characteristics of the elytra correspond in detail to those figured by Izuka for his *Polynoë clava*. The species has previously been recorded from Sagami Bay, Jogashima and Shimizu harbour, and also recorded from Seto and Yellow Sea by Fauvel (1932, 1936).

Lepidonotus squamatus (Linnaeus)

Polynoë squamata : Izuka, 1912, p. 12, pl. 3, figs. 7–9.

Occurrence : Katsura-jima (Sp. No. 933), Higashi-shiogama (Sp. No. 1344), Yogasaki (Sp. No. 1195).

The largest specimen of this common species measures 15 mm by 2.5 mm for 25 chaetigers. The elytra are generally speckled with dark brown pigments. The ventral bristles are undivided. The species is very common and widely distributed throughout the intertidal area along the Japanese waters. Izuka (1912) recorded formerly the species from Asamushi.

Lepidonotus helotypus (Grube)

Lepidonotus helotypus : Seidler, 1923, p. 56, figs. 12–13 ; Okuda, 1939, p. 224.

Polynoë gymnonota : Marenzeller, 1879, p. 112, pl. 1, fig. 3 ; Izuka, 1912, p. 8, pl. 3, figs. 1–4.

Polynoë ijimai : Izuka, 1912, p. 11, pl. 3, figs. 5–6.

Occurrence : Katsura-jima (Sp. No. 705), Mahanashi-jima (Sp. No. 658), Gotenzaki (Sp. No. 589).

The specimens are 40–55 mm by 8–9 mm. The dorsal setae are capillary with serrations and the ventral are unidentate. The elytra lack the marginal fringes. The coloration of the body and elytra is quite variable. The species commonly occurs in Japanese waters, and is distributed from Hokkaido to southern Japan. Frickhinger (1916) recorded *Lepidonotus dofleini* from the unknown locality of Japan. He separated his species from the closely allied species *P. gymnonota* and *P. ijimai* in the coloration of the elytra and the absence of the small tubercles on its surface. It has been stated, however, that the coloration of the elytra is varied to wide extent and the small tubercles on the surface of the elytra are often meagerly developed. Then, there is very little to distinguish this species from Frickhinger's *L. dofleini*. Izuka's *P. ijimai* is also, as far as the description goes, indistinguishable.

Lepidonotus dentatus Okuda, n. sp.

(Text-fig. 1)

Occurrence : Miyato (Sp. No. 1112).

A single complete specimen measures 14 mm by 2.5 mm without the feet for 25 chaetigers. The head is of the typical Lepidonotid type. The median and

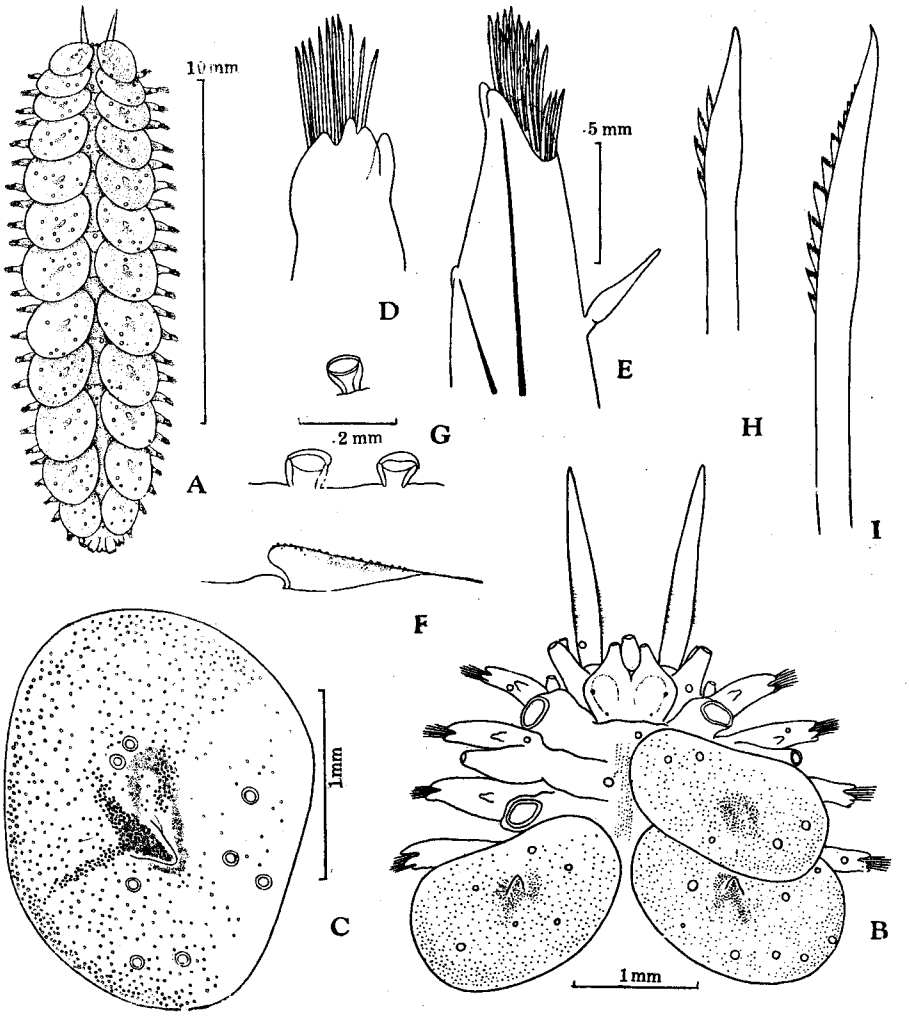

Fig. 1. *Lepidonotus dentatus* n. sp. A, Dorsal view of entire body; B, Dorsal view of anterior portion; C, 8th elytron; D, Pedal lobes of neuropodium; E, 12th parapodium; F, Protuberance at the middle of elytron; G, Tubercles from elytron; H–I, Ventral bristles, each from 13th parapodium.

lateral tentacles are detached. The palps are slender, smooth, more or less flattened, and about four times as long as the head. The elytra are kidney-shaped. Excepting for the first two pairs, the following elytra have a cone-shaped horny protuberance at the middle portion. The surface is covered with cup-shaped

tubercles, being especially crowded at the median portion and the outer margin. The border of the elytra is smooth, being devoid of any fringes. There are white round spots on the elytra and the dorsal body surface, distributing irregularly. The parapodia are subuniramous, the notopodia are rudimentary and are only indicated by a small process including a single aciculum. The notopodial setae are entirely lacking. The pedal lobes of the neuropodia are divided into 2–3 lappets. The neuropodial setae are arranged in about 6 rows. They are unidentate and have 4–13 spinous lamellae. The small cone-shaped nephridial processes begin at the 7th chaetiger. In the preserved state it is gray in color and the white spots scattered throughout the elytra are remarkable.

The present new species is included in the group in which the representatives are devoid of the notopodial setae. The allied species *L. melanogrammus* and *L. simplicipes* are both recorded from the Atlantic and have the neuropodial setae with bifid terminal end. The species is characterised by the shape of the elytra with the cone-shaped protuberance and the ventral setal lobe with divided lamellae.

Harmothoë (*Evarne*) *forcipata* Marenzeller

(Text-fig. 2)

Harmothoë forcipata : Marenzeller, 1902, p. 11, pl. 2, fig. 7.

Occurrence : Mahanashi-jima (Sp. No. 233).

A complete specimen measures 21 mm by 3 mm without the feet for 36 chaetigers. The elytra are firmly attached, covering the dorsum but leaving the mid-dorsal line exposed. It is neatly fringed on the external margins. The surface is covered with minute, chitinous tubercles. The breadth of the head is about 1.5 times as long as its length. The median tentacle is fallen off, and a pair of the lateral tentacles is about equal length with that of the head. The palps are slender, and about twice as long as the lateral tentacles. All of these tentacles taper distally with subterminal enlargement. The ventral cirri are short, not reaching to the tip of the ventral rami. The notopodial setae are unidentate and distally serrated. The neuropodial setae are bifid.

The species was first recorded by Marenzeller from Enoshima, Sagami Bay. We have some hesitation in attributing these specimens to this species. The present specimen is more or less different in having the elytra with well developed cirriform papillae at the external margin, but in other respects, it agrees with Marenzeller's description.

Harmothoë imbricata (Linnaeus)

Harmothoë imbricata : Marenzeller, 1879, p. 17, pl. 2, fig. 1 ; Izuka, 1912, p. 43, pl. 5, fig. 1-4, pl. 6, fig. 1 ; Okuda, 1935, p. 2 ; ———, 1936, p. 563 ; Fauvel, 1936, p. 50 ; Okuda, 1938, p. 83 ; ———, 1939, p. 224.

Occurrence : Kyo-jima (Sp. No. 1019, 980, 1057), Matsushima (Sp. No.

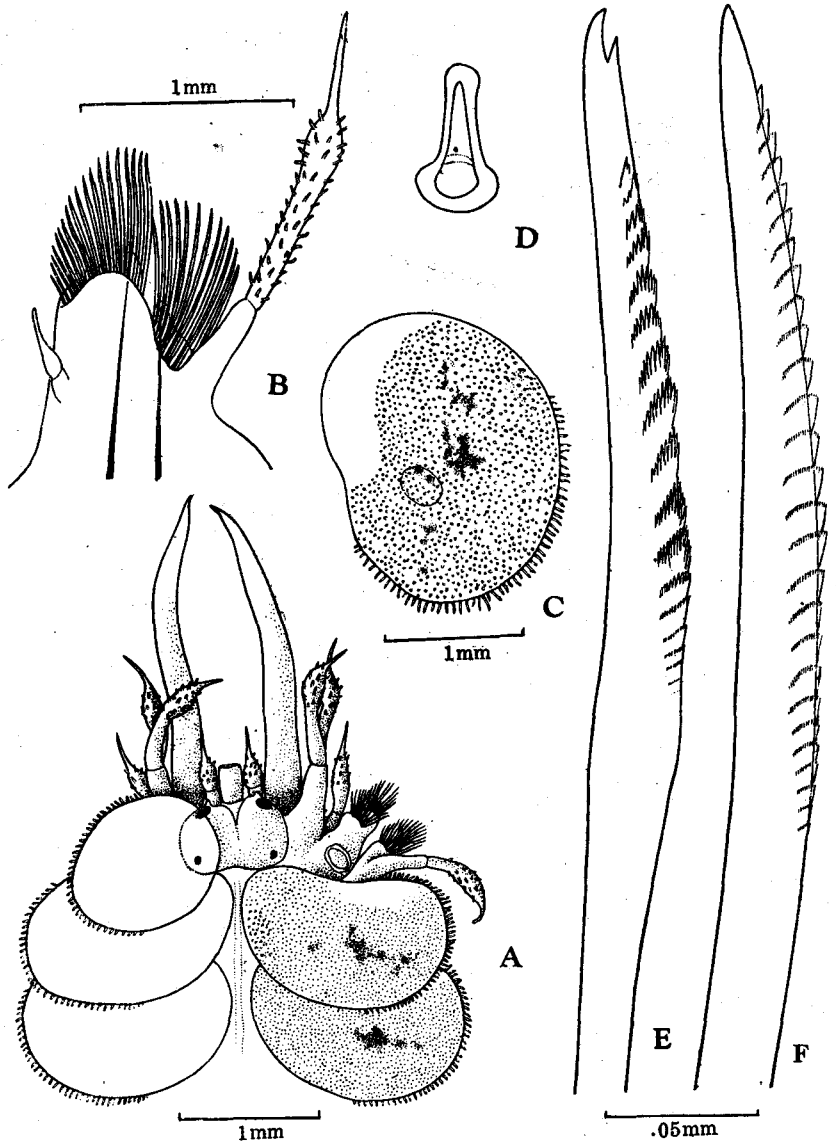

Fig. 2. *Harmothoë* (*Evarne*) *forcipata* Marenzeller. A, Dorsal view of anterior body ; B, 15th parapodium ; C, 8th elytron ; D, Tubercles from elytron ; E, Neuropodial seta ; F, Notopodial seta.

1259, 486, 950), Fukuura-jima (Sp. No. 292, 341), Yogasaki (Sp. No. 1211), Kunoshima (Sp. No. 379), Isozaki (Sp. No. 334, 1484), Katsura-jima (Sp. No. 736), Mahanashi-jima (Sp. No. 456), Togu (Sp. No. 1167), Jizo-jima (Sp. No. 1304).

The species is one of the commonest circumboreal forms distributed along the Japanese coasts from Sakhalin and the northern Kurile Islands to Kyushu. The body measures 25–30 mm by about 3 mm. The elytra are easily detachable, so most specimens bear no elytra. The color of elytra varies in considerable extent.

Halosydna nebulosa Grube

Halosydna nebulosa : Marenzeller, 1902, p. 567, pl. 1, fig. 1 ; Fauvel, 1936, p. 50 ; Okuda, 1938, p. 85 ; ———, 1940, p. 7.

Occurrence : Gotenzaki (Sp. No. 589).

The species is fairly common on the shore. Since the species was first recorded from Japan (from Hakodate and Nagasaki by Marenzeller in 1902), it has been recorded from various localities of Japan (Frickhinger, 1916 ; Fauvel, 1936 ; Okuda, 1938 and 1940). Frickhinger (1916) reported *Halosydna sagamiana* and *H. haberiana* as new species from Japan from the unknown districts. Frickhinger's description is, however, too vague for certain recognition. The pigmentation of the elytra appears to vary so much from individual to individual that it is doubtful as a specific differential.

Family PHYLLODOCIDAE

Phyllodoce castanea (Marenzeller)

Carobia castanea : Marenzeller, 1879, p. 127, pl. 3, fig. 2 ; Izuka, 1912, p. 199, pl. 21, fig. 2.

Phyllodoce castanea : Fauvel, 1932, p. 68 ; ———, 1936, p. 56 ; Okuda, 1938, p. 88.

Occurrence : Isozaki (Sp. No. 1485).

Single specimen was collected. The specimen preserved is dark reddish brown in color. Four pairs of lateral tentacles are present but are devoid of median one which is observable in the genus *Eularia*. The dorsal cirri are cardiform. It is known to occur widely throughout the warm waters. Marenzeller first recorded the species from Enoshima, Sagami Bay. It has been afterwards collected in several localities in Japan and also in the southern Pacific, Red Sea, Persian Gulf and California.

Phyllodoce maculata (Linnaeus)

Phyllodoce maculata : Fauvel, 1923, p. 151, fig. 53, a–c.

Occurrence : Yogasaki (Sp. No. 1212).

An incomplete specimen is present. The dorsal cirri are broadly ovoid, and the ventral ones are exceedingly small. The proximal part of the proboscis have about twelve rows of papillae, and each row has 7–8 papillae. The species

is distributed to northern waters, but is the first record from Japan. *Ph. groenlandica* is closely related to the present species: the most easily appreciable difference between the two forms lies in the fact that in *Ph. groenlandica* the ventral cirri are much broader than the present species.

Eularia (*Eumida*) *sanguinea* (Oersted)

Eularia sanguinea : Fauvel, 1936, p. 58.
E. (*Eumida*) *sanguinea :* Okuda, 1938, p. 88, textfig. 9 : ———, 1939, p. 227.

Occurrence : Togu (Sp. No. 1166).

The larger one of two specimens measures 50 mm by 2 mm. Besides 2 pairs of lateral tentacles a median tentacle is present anterior to eyes. The proboscis is long, smooth, and is devoid of any papillation. The dorsal cirri are broad and lanceolate. *Eumida sanguinea* described by Izuka (1912) seems to us the different species in having the rows of papillae on the proboscis. The species is cosmopolitan and has previously been recorded in Japan from Shimoda, Onagawa and Seto.

Family SYLLIDAE

Syllis (*Typosyllis*) *variegata* Grube

Syllis (*Typosyllis*) *variegata :* Fauvel, 1923. p. 262, fig. 97, h–n ; Okuda, 1939, p. 183, fig. 1.

Occurrence : Isozaki (Sp. No. 1482).

An incomplete specimen was collected. The dorsal cirri are slender, and well developed with many articulations. The tooth at the anterior margin of pharynx is rather small. The species is known from the Atlantic, Mediterranean and Indian Ocean.

Syllis sp.

Occurrence : Mahanashi-jima (Sp. No. H).

Single dried incomplete specimen is present. Judging from the structure of the head and the bristles it may belong to the present genus and is close to *Syllis fasciata*.

Family NEREIDAE

Nereis japonica Izuka

(Text-fig. 3, A)

Nereis japonica : Izuka, 1912, p. 163, pl. 17, figs. 14–16, 18.

Occurrence : Fukuura-jima (Sp. No. 287), Narusegawa (Sp. No. 772), Isozaki (Sp. No. 332), Tona (Sp. No. 1102).

Of the three complete specimens derived from Fukuura-jima the largest one measures 63 mm in length and 8 mm in width including parapodium, containing 89 chaetigerous segments. Groups VII and VIII of paragnathi are arranged in

single row. In this respect the present species is easily distinguishable from an allied species *N. diversicolor* in which the VII and VIII paragnathi are arranged in many lows. The species is one of the commonest littoral polychaetes in Japan. Izuka (1912) has also recorded the species from Matsushima Bay.

Nereis virens Sars

(Text-fig. 3, B)

Nereis dyamushi : Izuka, 1912, p. 169, pl. 18, figs. 1–7.

Occurrence : Yogasaki (Sp. No. 1176).

Two specimens are both devoid of the posterior part of the body. The notopodial upper lamellae are well developed and heart-shaped. It is difficult to distinguish *Nereis dyamushi* described by Izuka from the northern waters, from

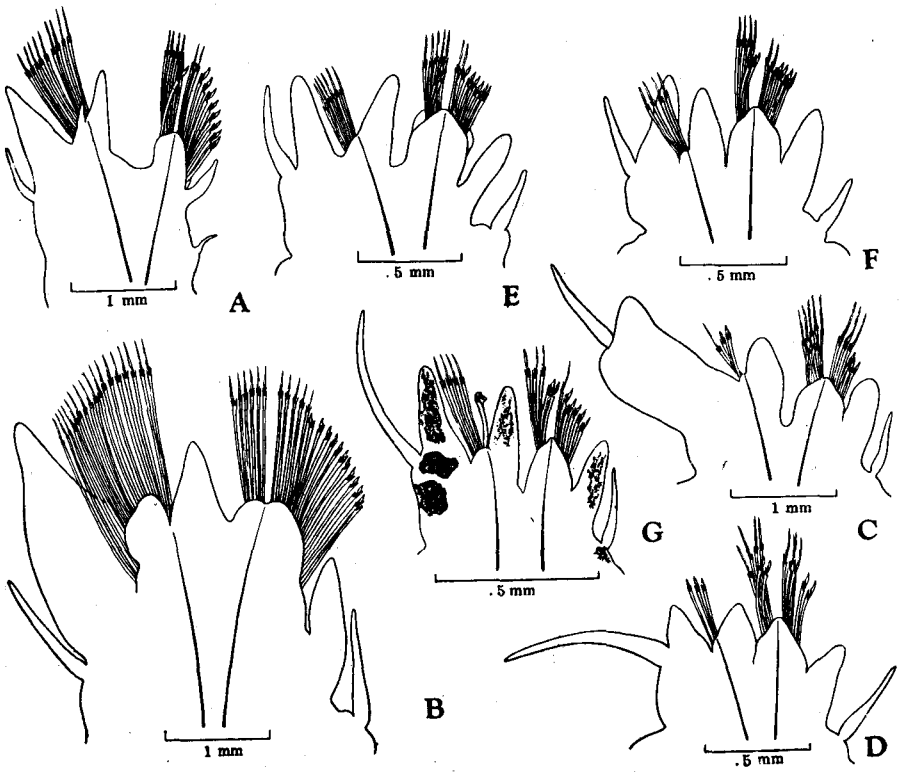

Fig. 3. The 40th parapodia of 7 nereids. A, *Nereis japonica* Izuka ; B, *Nereis virens* Sars ; C, *N. ezoensis* Izuka ; D, *N, pelagica* Linnaeus ; E, *Perinereis nuntia* var. *brevicirris* Grube ; F, *P. cultrifera* (Grube) ; G, *Platynereis agassizi* Ehlers.

the present species. It is distributed widely in the northern coasts of American and European waters.

Nereis ezoensis Izuka

(Text-fig. 3, C)

Nereis ezoensis : Izuka, 1912, p. 173, pl. 18, figs. 12–20 ; Fauvel, 1936, p. 61.

Occurrence : Mahanashi-jima (Sp. No. 660).

A single complete specimen measures 133 mm by 6 mm for 116 chaetigers. In the posterior body region the dorsal ligules of the parapodium are well developed. The species is very closely allied to *N. zonata* if not identical. This is widely distributed to the western Pacific, especially to boreal regions.

Nereis pelagica Linnaeus

(Text-fig. 3, D)

Nereis pelagica : Izuka, 1912, p. 154, pl. 17, figs. 1–6 ; Fauvel, 1923, p. 336, fig. 130, a–f.

Occurrence : Matsushima (Sp. No. 1068), Yogasaki (Sp. No. 1179, 1196, 1212), Fukuura-jima (Sp. No. 286), Katsura-jima (Sp. No. 1033).

The species occurs commonly along the Japanese coasts. The armature of the proboscis may be variable to some extent. The paragnathi of the groups VII-VIII are generally consisted of an anterior one or two rows of rather large denticles and posterior 2–3 rows of small denticles, but these small denticles are often arranged in several rows. The arrangement of paragnathi of the specimens derived from Fukuura-jima closely agrees with that in Izuka's figures of his specimens.

Perinereis nuntia (Savigny) var. *brevicirris* Grube

(Text-fig. 3, E)

Perinereis nuntia var. *brevicirris :* Fauvel, 1936, p. 63 ; Okuda, 1938, p. 92 ; ———, 1939, p. 231.

Nereis microdonta : Marenzeller, 1879, p. 118, pl. 2, fig. 2.

Occurrence : Yogasaki (Sp. No. 1179), Matsushima (Sp. No. 493), Higashi-shiogama (Sp. No. 1346), Fukuura-jima (Sp. No. 285, 289, 290, 340), Katsura-jima (Sp. No. 932).

This is a well-known cosmopolitan form common on the shore of Japan. The number of the paragnathi of the proboscis are as follows : I, 3 in a triangle ; II, in 3 oblique rows : III, in many longitudinal rows of 3–4 each ; IV, in a dense triangular group ; V, 3, one at each angle of an irregular triangle ; VI, 9 characteristic transverse rows of 8–10 large paragnathi ; VII-VIII, a conspicuous band of 3 indistinct rows. The specimens from Matsushima carry ripe eggs packed into the parapodium. Izuka (1912) has also recorded the species from Matsushima Bay.

Perinereis cultrifera **(Grube)**

(Text-fig. 3, F)

Nereis cultrifera : Izuka, 1912, p. 151, pl. 16, figs. 7-14.
Perinereis cultrifera : Fauvel, 1936, p. 62 ; Okuda, 1938, p. 92.

Occurrence : Yogasaki (Sp. No. 1212).

A single small specimen is an anterior fragment measuring 30 mm by 2.5 mm without the feet for 57 chaetigers. There is a pair of palps with rather stout palpophores and small globular styles. The tentacular cirri are rather short, the largest reaching back to the 4th chaetiger. A pair of tentacles is about equal in length to the palps. The first parapodium has single dorsal and ventral lobes of about equal length, and narrow postsetal ones. The digidform cirrus is about the same length as the dorsal lobe. The ventral cirrus is slightly shorter than the dorsal one. In the notopodium the bristles are all homogomph spinigers with slender, denticulated knife-shaped blades. The neuropodium has dorsally a few homogomph spinigers and heterogomph falcigers. The dorsal setigerous division consists of only spinous homogomphs, the upper part of the ventral division contain homogomph spingers and heterogomph falcigers, while the lower part of the same comprised of heterogomph falcigers and a single spinous heterogomph seta. The arrangement of the paragnathi is as follows : I, 2 in a line ; II, triangular cluster of 13–15 paragnathi on each side ; III, transverse band of small paragnathi of about 3 irregular rows ; IV, clusters roughly of 3 rows (16–18) ; V, a triangular patch of 3 paragnathi ; VI, a single transverse elongated paragnath on each side ; VII–VIII, continuous double rows. The specimen shows no pigmantation.

The present specimen may be attributed to the species *Perinereis cultrifera* var. *typica*. According to Dr. Utinomi the species was found being commensalistic with a bivalve *Pteria martensii* in the mantle cavity. The species is widely distributed to the warm and tropical waters and is known from southern Japan.

Platynereis agassizi **Ehlers**

(Text-fig. 3, G)

Platynereis agassizi : Fauvel, 1936, p. 64 ; Okuda, 1938, p. 93.

Occurrence : Katsura-jima (Sp. No. 918).

The largest one in 3 specimens collected measures 24 mm by 3 mm for 54 setigerous segments. The tentacles are slender, the distal end of the longest ones attaining to the 17th or 18th setigerous segments.

In 1912 Izuka described *P. kobiensis* and *P. dumerilii*, both species possess a bifid hook-shaped bristle at the dorsal ramus. He did not mention why he separated these species, but there seems to be no reason to doubt that these two species described by Izuka are identical with *Platynereis agassizi*. As to the affinity between *P. agassizi* and *P. dumerilli*, Monro (1933) has thoroughly discussed and he mentioned *P. agassizi* as only a variety of *P. dumerilli*. From a comparison

of the descriptions of above species makes to incline us very strongly to the opinion that they are synonymous. We can find no definite characters that serve to distinguish the one from the other.

The species is commonly distributed to the Pacific.

Family NEPHTHYDIDAE

Nephthys caeca (Fabricius)

(Text-fig. 4)

Nephthys caeca : Ehlers, 1868, p. 588, pl. 23, figs. 10–34 ; Okuda, 1938, p. 123.

Occurrence : Suzaki-hama (Sp. No. 533), Mahanashi-jima (Sp. No. 664), Tona (Sp. No. 46).

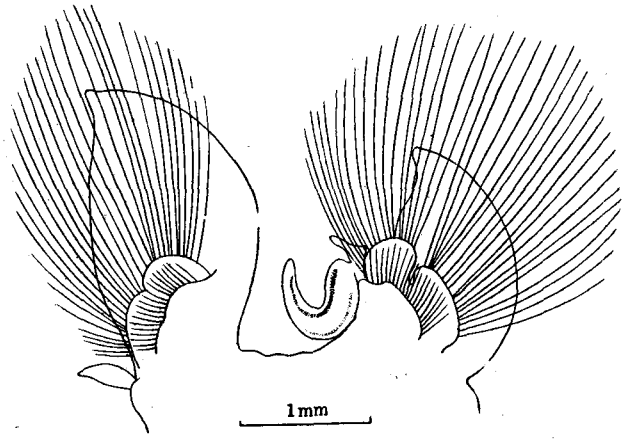

Fig. 4. *Nephthys caeca* (Fabricius). 60th parapodium.

The largest specimen measures 150 mm by 9 mm including parapodia for 157 setigerous segments. The proboscis bears 22 longitudinal rows of papillae, generally 4–5 in each row. There is no median papilla. The dorsal and ventral rami of the parapodium have an anterior lamella which is distinctly divided into two lobes by an incision.

The feature of the parapodium agrees well with the Ehler's figures. The species rather resembles *Nephthys ciliata* in the distinctly divided parapodial lamella, but differs in the following respects : In *N. ciliata* the setae are very long and a median papilla is present on the proboscis. The species is commonly distributed to boreal regions, and has been reported in Japan from northern Kuriles, Hokkaido and Sagami Bay. The senior author has reported from Onagawa Bay a variety of the species, *N. caeca* var. *ciliata*, but it seems now that the variety

was represented by errantiate individuals of the species.

Family GLYCERIDAE

Glycera subaenea Grube

(Text-fig. 5)

Glycera subaenea : Fauvel, 1919, p. 425, pl. 16, figs. 48–51.
Glycera hasidatensis : Izuka, 1912, p. 246, pl. 24, figs. 14–15.

Occurrence : Tona (Sp. No. 1101).

Of two specimens collected the larger one measures 230 mm by 7 mm for 232 setigerous segments and the other one 125 mm by 5 mm. The branchiae project from the central part anterior to parapodia, divided into 2 or 6 branches. The first and the second parapodia are destitute of dorsal cirri. The posterior upper and lower lobes are unequal in length in the parapodia of both anterior and middle body segments, while almostly equal in the posterior segments. The dorsal setae are capillary and the ventral cetae are jointed.

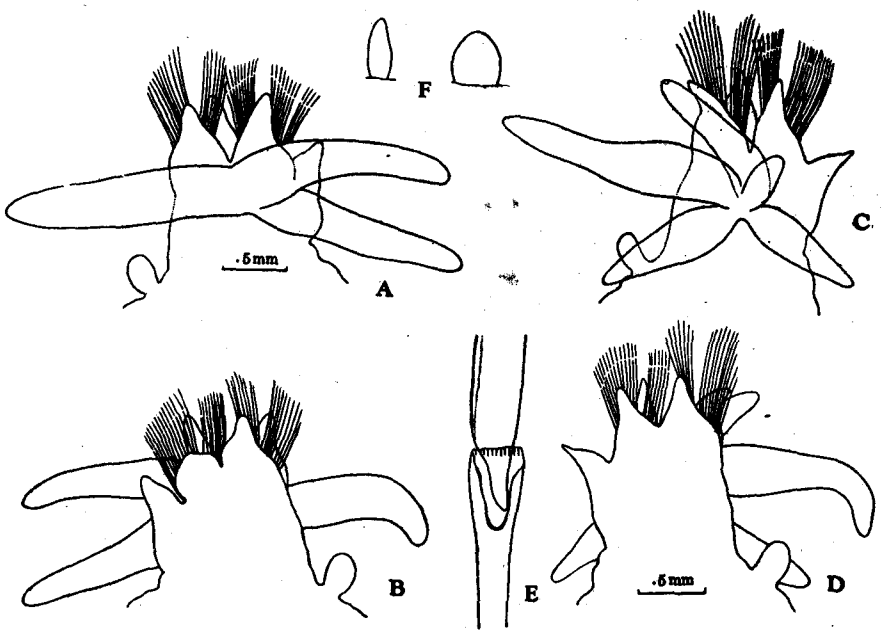

Fig. 5. *Glycera subaenea* Grube. A, 95th parapodium, anterior view ; B, The same, posterior view ; C, 160th parapodium, anterior view ; D, The same, posterior view ; E, Junction in ventral setae ; F, Papillae from proboscis.

It seems to us that the present species is indistinguishable from *G. hasidatensis* which was described by Izuka (1912) from Hashidate, Tango in middle

Japan, so the latter may be synonymous with the present species. The species has been reported from the Philippines and Madagascar.

Glycera rouxii Audouin et M. Edwards

Glycera goesi : Izuka, 1912, p. 238, pl. 24, figs. 1–2.
Glycera rouxii : Fauvel, 1936, p. 70 ; Okuda, 1937, p. 275 ; ———, 1938, p. 94 ; ———, 1939, p. 232.

Occurrence : Katsura-jima (Sp No. 707).

A complete specimen measures 65 mm by 3 mm. The branchiae are often retracted, mostly simple club-shaped or rarely dichotomously branched, projecting from the central part anterior to parapodia. Both the posterior upper and lower lobes of the parapodium are not equal in length, and the lower ones are smaller than the upper ones and the top of them are conical in form. The species is commonly distributed among the Japanese waters.

Family EUNICIDAE

Marphysa sanguinea (Montagu)

Marphysa sanguinea : Fauvel, 1936, p. 69 ; Okuda, 1937, p. 286, fig. 31 ; ———, 1938, p. 96 ; ———, 1939, p. 236.
Marphysa iwamushi : Izuka, 1912. p. 131, pl. 1, fig. 8, pl. 14, figs. 11–16.

Occurrence : Mahanashi-jima (Sp. No. 663), Kuno-shima (Sp. No. 375), Katsura-jima (Sp. No. 706), Yogasaki (Sp. No. 1175), Tona (Sp. No. 1100), Matsushima (Sp. No. 1067).

In most specimens the branchiae begin to appear from the 25th or 26th segments and in one specimen these appear from the 18th segment, while the specimen from Mahanashi-jima measuring 160 mm by 8 mm for 370 setigerous segments has the first branchiae on the 33rd segment.

The species is widely distributed in Japanese waters.

Diopatra neapolitana Delle Chiaje

Diopatra sugokai : Izuka, 1912, p. 110, pl. 1, fig. 6, pl. 11, figs. 13–16.
Diopatra neapolitana : Fauvel, 1932, p. 28, figs. 3–4 ; Okuda, 1938, p. 96 ; ———, 1939, p. 236.

Occurrence : Suzaki-hama (Sp. No. 531).

Two incomplete specimens were collected. It lives in the tubes which are beset with foreign matters as shells, sand grains, algal particles or another. This is characteristic to the species. The branchiae are spirally coiled, appearing on the 4th or 5th setigerous segment. It is very commonly found in sandy or muddy bottoms in southern Japanese waters. Izuka has reported the species from Matsushima Bay under the name of *D. sugokai*.

Lumbriconereis impatiens Claparéde

Lumbriconereis impatiens : Fauvel, 1923, p. 429, fig. 171, a–i ; Crossland, 1932, p. 152 ;

Okuda, 1938, p. 126 ; ———, 1938, p. 97, fig. 14.

Occurrence : Katsura-jima (Sp. No. 707), Suzakihama (Sp. No. 532).

One complete and one incomplete specimens were collected. The species resembles *L. heteropoda*, but in the latter the simple crochets on the anterior parapodia are absent and the parapodial lobes in the posterior segments are long and erect. It occures commonly in Japanese waters and is distributed to the Atlantic, Mediterranean, Red Sea and Indian Ocean.

Lumbriconereis latreilli Audouin et M. Edwards

Lumbriconereis japonica : Marenzeller, 1879, p. 137, pl. 5, fig. 3 ; Izuka, 1912, p. 139, pl. 14, figs. 17–18.

Lumbriconereis latreilli : Crossland, 1924, p. 10, figs. 8–40 ; Okuda, 1938, p. 98 ; ———, 1939, p. 236.

Occurrence : Matsushima (Sp. No. 1261).

The larger one in two specimens examined measures 88 mm by 3 mm. The species is distinguishable from the former species in the presence of jointed compound crochets. In the present specimens the jointed crochets are present in about 20 anterior segments and unjointed, simple crochets are in the following segments. Concerning the affinity of the present species to *L. japonica* Crossland (1924) thoroughly discussed it.

Arabella iricolor (Montagu)

Arabella iricolor : Fauvel, 1936, p. 70 ; Okuda, 1938, p. 97 ; ———, 1939, p. 236.

Occurrence : Katsura-jima (Sp. No. 707).

Single incomplete specimen was collected. This is one of the commonest species along the Japanese coasts. The species is widely distributed in the world. There are often clark blue longitudinal bands on the dorsal surface of the body.

Staurocephalus matsushimaensis Okuda, n. sp.

(Text-fig. 6)

Occurrence : Togu (Sp. No. 1165), Katsura-jima (Sp. No. 1055), Isozaki (Sp. No. 1487).

The largest one in five specimens from Togu measures 24 mm by 2.5 mm for 75 setigerous segments. The head is conical, with a pair of tentacles and a pair of palps. The tentacles are rather large, 9-jointed, equaling or slightly exceeding the palps in length. The palps are broad, leaf-shaped, suddenly dwindling in the distal top. Two pairs of eyes are present, the anterior pair larger and at the base of the tentacles. The first setigerous segment without dorsal cirri. The dorsal cirri appearing from the 2nd setigerous segment are club-shaped, longer than notopodia, with a constriction near the top forming a terminal knob. The ventral cirri are shorter than neuropodia, spindle-shaped. There are two sorts

of dorsal setae. The ones are capillary and closely denticulate ; the others rather thick as compared with the formers and bearing 2 teeth at the top. The ventral setae are compound ones, closely denticulated at the distal and basal part, with 2 teeth at the top. No clochets. The maxillae are rather complicatedly constricted, composed of about 23 pairs of teeth plates in upper series and about 40 pairs in lower series, these are arranged in 2 rows on each side. The teeth plates on upper series are with 5 teeth when well-developed and ones on lower series with 6 teeth. It is, however, observable that variations are present in form and number of these teeth. The basal teeth plates are comb-shaped, with 10 teeth. The mandibles are upset V-shaped, thick and strong, with 7–8 small conical processes

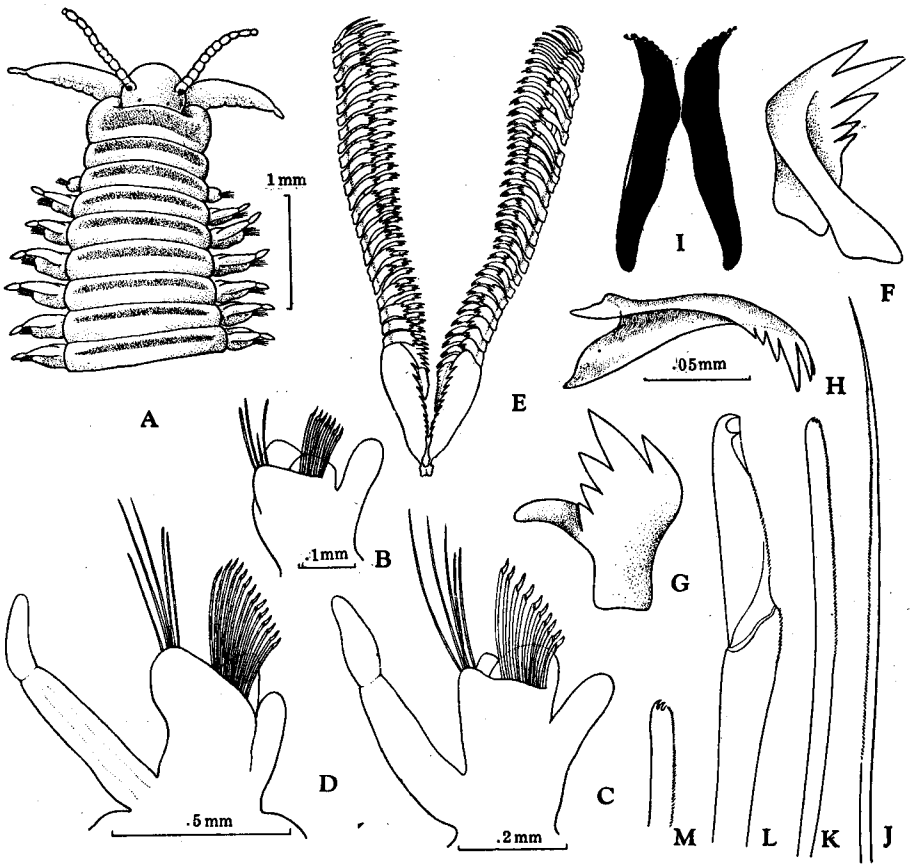

Fig. 6. *Staurocephalus matsushimaensis* n. sp. A, Dorsal view of anterior body ; B, 1st parapodium ; C, 2nd parapodium ; D, 25th parapodium ; E, Maxillae ; F–G, Upper teeth plate of maxillae ; H, Lower teeth plate of maxillae : I, Mandibles ; J–K, Dorsal setae ; L, Ventral setae ; M, Distal part of ventral setae.

in upper edges.

The species is similar to *S. gardineri*, *S. australiensis* and *S. rudolphii*, in two longitudinal rows of maxillar plates, but differs from them in the following respects: 1) There are no dorsal cirri in the first setigerous segment; 2) The tentacles are rather large and jointed; 3) The ventral compound setae are denticulated. It is rather similar to *S. crassa* in the features of maxillar plates, tentacles and setae, but differs from that species in having a terminal knob in the dorsal cirri. Annenkova (1937) reported from the Okhotk Sea *S. moniloceras* and *S. japonica*, but the present species differs from these species in the following respects: in *S. moniloceras* the teeth plates of upper jaws arrange in 3 longitudinal rows and in *S. japonica* U-shaped dorsal setae are present.

Family CIRRATULIDAE

Cirratulus chrysoderma Claparéde

Cirratulus chrysoderma: Fauvel, 1936, p. 73.

Occurrence: Togu (Sp. No. 1162, 1163, 1164), Mahanashi-jima (Sp. No. 659), Katsura-jima (Sp. No. 704).

Several contracted specimens were collected. The body is conspicuously coiled, measuring about 40–50 mm in length. The branchial and tentacular filaments both first appear on the same segment. The tentacular filaments are in dense clusters on the 4th–6th setigerous segments. No eye-spots.

The species is distributed on warm and tropical waters of the Pacific, Indian Ocean and the Mediterranean, and in Japan it has been recorded from Seto by Fauvel.

Audouinia comosa (Marenzeller)

Cirratulus comosa: Marenzeller, 1879, p. 39, pl. 6, fig. 7.
Audouinia comosa: Fauvel, 1933, p. 46; ———, 1936, p. 73; Okuda, 1937, p. 51, pl. 2, fig. B.

Occurrence: Mahanashi-jima (Sp. No. 232, 417, 1379), Higashi-shiogama (Sp. No. 1345, 1351), Fukuura-jima (Sp. No. 289, 290), Kuno-shima (Sp. No. 378), Yogasaki (Sp. No. 1177, 1178), Matsushima (Sp. No. 487), Isozaki (Sp. No. 335), Tedaru (Sp. No. 363).

The tentacular filaments are in dense clusters on the 6th-7th setigerous segments. The branchial filaments are from the first setigerous segment. The dorsal hooks are about 3–6, from about the 45th–70th notopodia. The ventral hooks first appear on about the 20th–40th neuropodia.

This species is widely distributed in Japanese waters, and is one of the commonest species in Japanese waters.

Acrocirrus validus Marenzeller

Acrocirrus validus: Marenzeller, 1879. p. 148, pl. 6, fig. 8; Okuda, 1934, p. 206, figs.

8–9 ; Fauvel, 1936, p. 74 ; Okuda, 1938, p. 99.

Occurrence : Gotenzaki (Sp. No. 591).

A complete specimen measures 54 mm by 6.5 mm. A pair of tentacular filaments are present in the head. Each of the anterior 4 segments are bearing a pair of branchiae. The species is commonly found along the Japanese coasts. It occurs in sandy and muddy bottoms, under stones.

Family CAPITELLIDAE

Notomastus latericeus Sars

(Text-fig. 7)

Notomastus latericeus : Fauvel, 1927, p. 143, fig. 49, a h ; Okuda, 1940, p. 21.

Occurrence : Miyato (Sp. No. 111).

A single complete specimen was collected. The body is large, measuring 330 mm by 4 mm, divided into thoracic and abdominal regions. There are 11 thoracic segments with only dorsal and ventral capillary setae. The crochets are only present on abdominal segments. The branchiae are reduced to small hemispherical protuberances. This species is widely distributed in warm and tropical regions of the world and in Japanese waters the senior author (1940) has described it from the Ryukyu Islands.

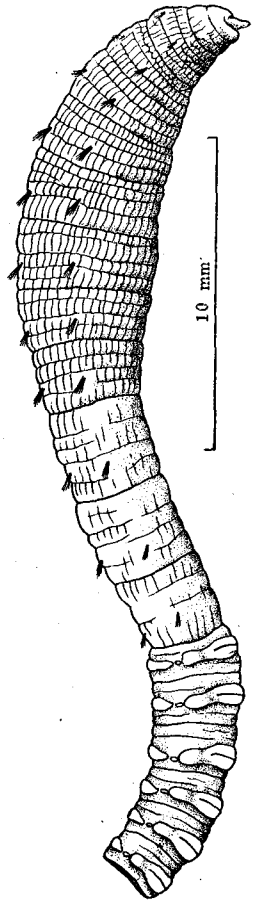

Fig. 7. *Notomastus latericeus* Sars. Anterior part of body.

Family ARENICOLIDAE

Arenicola cristata Stimpson

Arenicola cristata : Okuda, 1937, p. 54.

Occurrence : Mahanashi-jima (Sp. No. 231, 257), Fukuura-jima (Sp. No. 133).

The body bears 17 setigerous segments and the branchiae are of 11 pairs. It is noteworthy that a specimen from Mahanashi-jima has abnormally 18 setigerous segments and 12 pairs of branchiae. A specimen collected on August 9th was filled with mature eggs. The species is commonly found in muddy bottom along the Japanese coast from Hokkaido to southern Japan and the Korean Archipelago.

Arenicola claparedii Levinsen

Arenicola claparedii : Okuda, 1933, p. 217, pls. 19–21.

Occurrence : Mahanashi-jima (Sp. No. 230).

Two incomplete specimens were collected. The species is distinguishable from the former species in that the branchiae are in 13 pairs and the oesophageal glands are in several pairs. This species is widely distributed from the northern Kurile Islands to middle Japanese coasts.

Family AMPHICTENIDAE

Pectinaria hyperborea Malmgren

Cistenides hyperborea : Moore, 1903, p. 479.

Pectinaria hyperborea : Nilsson, 1928, p. 31, fig. 9 ; Okuda, 1937, p. 56, fig. 5, pl. 2, fig. F.

Occurrence : Yoshidahama (Sp. No. 216).

Only a tube was collected. The tube is horn-shaped, mostly consisted of sand grains. The former localities of this species in Japan are as follows: Tuboruti, North Japan (Nilsson), Sendai Bay (Moore) and Onagawa Bay (Okuda).

Family TEREBELLIDAE

Amphitrite oculata Hessle

(Text-fig. 8)

Amphitrite oculata : Hessle, 1917, p. 168 ; Fauvel, 1936, p. 80.

Occurrence : Isozaki (Sp. No. 333, 1481), Matsushima (Sp. No. 1258).

The largest specimen from Matsushima measures 60 mm by 4 mm for 72 chaetigers. A number of small eye-spots scattering on the peristomium. The branchiae are filiform, not branched, in 3 pairs, on

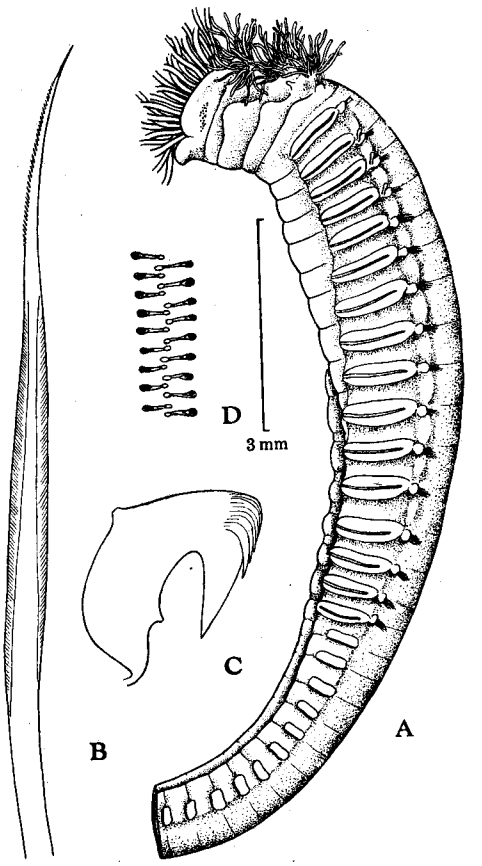

Fig. 8. *Amphitrite oculata* Hessle. A, Lateral view of anterior body ; B, Dorsal setae ; C, Uncinus from thoracic segments; D, Uncini arranged in double rows.

the 2nd to 4th segments. The thoracic setigerous segments are 17 in number, and begining from the 4th segment. The dorsal capillary setae are fringed and bordered with denticulated tips. The uncini are arranged in double rows from 8th to 17th segments. The nephridial papillae are present on the 3rd and the 6th–8th segments. Our specimens preserved are all dark purple in color and in the specimens from Isozaki there scattered yellowish gray spots.

This species was described from Misaki as a new species by Hessle (1917) and afterwards reported from Seto by Fauvel (1936).

Amphitrite rubra (Risso)

Amphitrite vigintipes : Marenzeller, 1884, p. 199, pl. 1, fig. 1.
Neoamphitrite vigintipes : Hessle, 1917, p. 183.
Amphitrite rubra : Fauvel, 1936, p. 81 ; Okuda, 1937, p. 58, pl. 2, fig. G.

Occurrence : Jizo-jima (Sp. No. 785), Yogasaki (Sp. No. 786).

The specific characters of the present specimens very closely coincide with those of the Onagawa specimens which were reported by the senior author (1937). The tube is rather membraneous and adhered with mud or sand grains. The species is distinguishable from *Amphitrite bifurcata* (= *A. ramosissima*) reported from Sendai Bay by Moore (1903) in the number of setigerous segments and nephridial papillae. This species is widely distributed through Japanese coasts.

Nicolea gracilibranchis (Grube)

(Text-fig. 9)

Nicolea gracilibranchis : Hessle, 1917, p. 173 ; Fauvel, 1936, p. 81.

Occurrence : Mahanashi-jima (Sp. No. 12), Fukuura-jima (Sp. No. 291).

A specimen from Mahanashi-jima measures 38 mm by 5 mm for 52 chaetigers. The branchiae are of 2 pairs, the first pair is more developed and exteded than the other pair. The nephridial papillae are present on the 3rd, 6th and 7th segments, but are rather inconspicuous on the 3rd segment. Seventeen setigerous segments are present. The uncini are with a crest of 3 denticles above the main fang.

The present species is a tropical form and distributed in Hawaii, the Philippines, and the Indian Ocean. In Japanese waters it is known from Misaki, Seto, Kyushu and the Ryukyu Islands.

Pista elongata Moore

Pista elongata : Moore, 1909, p. 270, pl. 9, figs. 45–47 ; Monro, 1933, p. 1068 ; Berkeley, 1929, p. 5 ; ———, 1936, p. 773 ; Okuda, 1937, p. 60, fig. 8.
Pista maculata : Marenzeller, 1884, p. 204, pl. 1, fig. 5, a–d.
Pista marenzelleri : Hessle, 1917, p. 157.

Occurrence : Jizo-jima (Sp. No. 785).

A complete specimen measures 63 mm by 4 mm. Three pairs of ramified

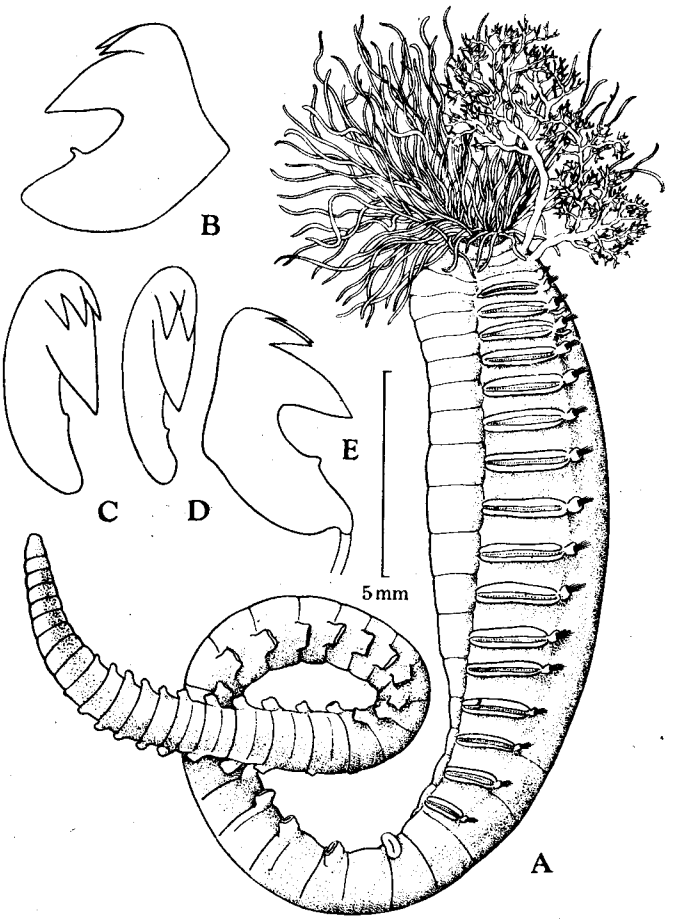

Fig. 9. *Nicolea gracilibranchis* Grube. A, Lateral view of entire body ; B, Uncini from thoracic segments ; C-E, Uncini from abdominal segments.

branchiae are present, the first pair of them has well developed peduncle. There are 17 setigerous thoracic chaetigers. The dorsal capillary setae are fringed. The ventral uncini of the first neuropods are large, with long shafts and a prominent anterior projection. The tube is rather stiff, composed of a chitinous material heavily beset with coarse sand particles.

This species is distributed on the Pacific coasts of the United States and on the Japanese coasts. Marenzeller (1884) described *Pista maculata* from Enoshima, Sagami Bay. Afterwards Hessle (1917) changed *P. maculata* to *P.*

marenzelleri because the name *maculata* had been preoccupied by other species. Moore (1909), however, already reported the same species under the name *P. elongata* from the Californian coast, we must identify it here with *P. elongata*.

Thelepus setosus (Quatrefages)

Thelepus japonica : Marenzeller, 1884, p. 12, pl. 2, fig. 4.
Thelepus setosus : Fauvel, 1927, p. 273, fig. 95, a–h ; Okuda, 1937, p. 61.

Occurrence : Matsushima (Sp. No. 1065), Isozaki (Sp. No. 331, 1481), Zaimoku-jima (Sp. No. 891), Kyo-jima (Sp. No. 1020), Tona (Sp. No. 544).

The tubes are cemented with shell particles and sand grains. The species is widely distributed on Japanese coasts, and has been recorded by the senior author (1937) from Onagawa Bay.

Amaea trilobata (Sars)

(Text-fig. 10)

Amaea trilobata : Wollebaek, 1912, p. 76, pl. 17, figs. 1–5 ; Fauvel, 1927, p. 285, fig. 99, a–e.

Occurrence : Kuno-shima (Sp. No. 377), Matsushima (Sp. No. 488).

The largest specimen measures 52 mm by 4 mm consisting of 72 setigerous segments. At the anterior end there exist numerous slender, filamentous tentacles, the distal end of which expanded in rhombic shape. No eye-spots. The nephridial papillae are cirriform, in 11 pairs, occurring first on the 4th setigerous segment. The notopodia are of 10 pairs, appearing first on the 3rd segment. The dorsal setae are capillary, and bordered with numerous closely-set teeth. The neuropodia are begining from the 21st segment, being only small mammilary processes, containing usually 4 capillary ventral uncini. Each body segment is composed of 2 annuli, each of them subdivided into several annulets. The numerous papillae are present on anterior, ventral body surface.

This boreal form is first recorded from Japan. Though the smooth dorsal setae were described by Fauvel and others, the ones of our specimens are closely denticulate as Hessle (1917) mentioned.

Family SABELLIDAE

Sabellastarte indica (Savigny)

Laonome japonica : Marenzeller, 1884, p. 212, pl. 3, fig. 4.
Sabellastarte indica : Johansson, 1927, p. 154 ; Fauvel, 1936, p. 84 ; Okuda, 1937, p. 307, fig. 53 ; ———, 1938, p. 103.

Occurrence : Gotenzaki (Sp. No. 588).

A single complete specimen measures 80 mm without branchiae by 14 mm. The branchiae are yellowish brown in color, scattered with dark brownish spots. The tube is somewhat leathery and is found in rock crevices in the shore. The species is very commonly found in warm region of Japanese waters, called as

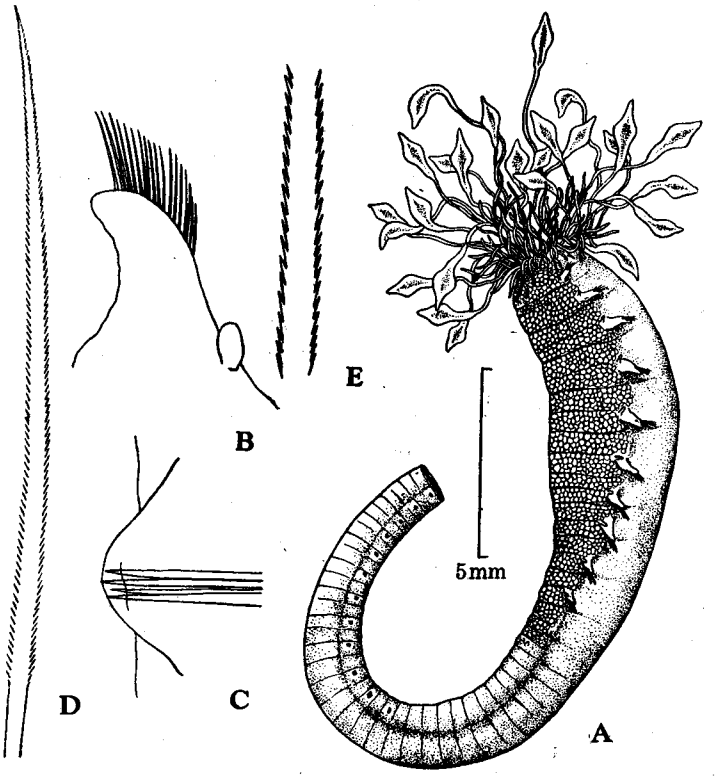

Fig. 10. *Amaea trilobata* (Sars). A, Lateral view of anterior body ; B, 5th parapodium ; C, Abdominal neuropodium containing ventral uncini ; D, Dorsal setae ; E, The same, enlarged.

"Keyari" in Japanese. It is widely distributed in the southern Pacific and the Indian Ocean, and the Red Sea.

Potamilla reniformis (O. F. Müller)

Potamilla reniformis : Okuda, 1937, p. 61.

Occurrense : Mahanashi-jima (Sp. No. 457).

A tube embedded into a Hexactinellid sponge is somewhat horny, more or less adhered with sand grains. The terminal end of tube is roolled inwards. The branchial filaments bear large dorsal eye-spots. In Japan the species was first recorded by the senior author (1937) from Onagawa Bay.

Hydroides norvegica Gunnerus

Hydroides norvegica : Fauvel, 1936, p. 87.

Occurrence : Katsura-jima (Sp. No. 910), Kyo-jima (Sp. No. 1054), Togu (Sp. No. 1168), Yogasaki (Sp. No. 1180).

The species is cosmopolitan and widely distributed in Middle Japan. *Hydroides multispinosa*, which was described as a new species by Marenzeller (1884) from Enoshima, seems to be a synonym of this species, as the difference between two species is in the shape of the operculum and is very little. Fauvel (1936) has reported the species from Seto.

Spirorbis foraminosus Moore et Bush

Spirorbis foraminosus : Moore et Bush, 1904, p. 176, figs. c-d ; Okuda, 1938, p. 104.

Occurrence : Isozaki (Sp. No. 814), Yaki-jima (Sp. No. 1367).

A number of empty tubes were collected. The species is widely distributed in warm waters of the Pacific and the Indian Ocean.

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